# CHAPTER 8

# Mixed Low-Level Waste

## 8.1 Introduction

This chapter provides data on the volume and location of mixed low-level waste (MLLW) managed by the Department of Energy (DOE). The data summarize the following reported volumes: inventory (storage), new generation, treatment, receipts, and disposal. The sections that address MLLW inventory and new generation provide additional information about the physical forms of the MLLW. Throughout the chapter, the data summarize the volume of MLLW managed during both the 1998 and 1999 fiscal years (FY) and provide current DOE projections for MLLW reported inventories and management activities through FY 2070.

A summary of MLLW volumes by inventory and management activity for fiscal years 1998 and 1999 is provided in Table 8-1. See Section 8.1.3 for a projection summary of MLLW volumes by inventory and management activity.

***This chapter includes:***

The reported volumes and locations of MLLW-*radioactive waste* at the site, state, and DOE-wide levels. Waste water volumes are excluded from all totals except those in Section 8.7, which provides the reported MLLW waste water volumes.

***This chapter does not include:***

The reported volumes of MLLW-*contaminated media*[1], which are covered in Chapter 10.

**Table 8-1**
**Summary of Total MLLW Volumes by Inventory and Management Activity as Reported by Sites: FY 1998 and FY 1999 Actuals**
(Includes all physical forms except waste water)

In cubic meters

| | FY 1998 Total | FY 1999 Total |
|---|---|---|
| Inventory (Storage) | 66,480 | 44,455 |
| New Generation | 2,954 | 2,968 |
| Treatment | 6,112 | 4,160 |
| Receipts | 3,885 | 16,576 |
| Disposal | 3,712 | 16,410 |

[1] Contaminated media are materials such as soil, sediment, surface water, ground water, and others (e.g., sludge and rubble/debris that are intermixed with media) that are contaminated at levels requiring cleanup or that require further assessment to determine whether an environmental restoration action is warranted. See Chapter 10 for further information.

### 8.1.1 MLLW Definition and Explanation

**MLLW** is defined as:

> Low Level Waste (LLW)[2] determined to contain both a hazardous component subject to the Resource Conservation and Recovery Act (RCRA) and a radioactive component subject to the Atomic Energy Act (DOE Order 435.1, issued July 1999).

MLLW is comprised of items such as waste from mercury cleanup kits, contaminated lead shielding bricks, contaminated water taken out of sumps, and spent solution from analytic chemistry operations.

MLLW is similar in radioactive composition to LLW and is generally less radioactive than high-level waste. Depending on the waste source, MLLW may contain a broad range of radionuclides. The hazardous constituents in MLLW may include toxic heavy metals, organic solvents, cyanides, explosive compounds, and corrosive chemicals and solutions. Some MLLW also contains polychlorinated biphenyls (PCBs) regulated under the Toxic Substances Control Act (TSCA).[3]

The hazardous component of MLLW is often a major factor in determining how to manage the waste, whereas for high-level waste and transuranic waste, the determining factor is typically the radioactive component. Although MLLW was not formally defined by statute as a separate waste type until 1992, the DOE recognized the need to manage it separately much earlier and began doing so in the 1980s.[4]

Thirty-four DOE sites in twenty-one states currently manage MLLW as part of the following types of activities:

- Materials production;
- Facility deactivation and decommissioning[5];
- Equipment maintenance; and,
- Treatment and handling of MLLW and other waste types.[6]

### 8.1.2 Organization of MLLW Data

This chapter provides data on the volume of MLLW in inventory and managed by the DOE. The data cover the FY 1998 and FY 1999 "actuals" as well as the projected MLLW

#### About the Data in This Chapter

- The FY 2000 DOE Environmental Management (EM) Corporate Database provided the data for this chapter. The data in the EM Corporate Database are available through the Central Internet Database (CID), located at ***http://cid.em.doe.gov***. (Please see Chapter 1 for more information on both the EM Corporate Database and the CID.)
- The data in this report are in a summary format (i.e., by site rather than by waste stream). The CID offers additional details (e.g., stream level data, or comprehensive data about a specific site or activity).
- The MLLW quantity data in this report are rounded to the nearest cubic meter. Exceptions occur if the data show less than one cubic meter. In these cases, data are rounded to one significant digit.
- The MLLW quantity data in this report are presented according to various categories, i.e., by the amount in inventory, generated, treated, received, etc. When considered across these categories, the data are not necessarily mutually exclusive. In other words, a particular amount of MLLW may be generated, treated, and disposed of – all during the same fiscal year. The same holds true for data on projected waste. For these reasons, this report does not provide data summaries across the different data categories that would misleadingly suggest data exclusivity.

[2] See Chapter 7: LLW Definition and Explanation.
[3] U.S. Department of Energy, Office of Environmental Management, *Linking Legacies: Connecting the Cold War Nuclear Weapons Production Processes to Their Environmental Consequences,* DOE-EM-0319 (January 1997).
[4] Ibid.
[5] Deactivation and decommissioning activities may result in both radioactive waste and very small amounts of contaminated media.
[6] U.S. Department of Energy, Office of Environmental Management, *Linking Legacies: Connecting the Cold War Nuclear Weapons Production Processes to Their Environmental Consequences*, DOE-EM-0319 (January 1997).

volumes through FY 2070. In the generation and inventory sections (8.2 and 8.3), the chapter provides more detailed information on physical forms of MLLW.

Waste water volumes are excluded from all totals except those in Section 8.7, which provides the reported volumes of MLLW waste water in inventory and managed across the DOE complex.

### 8.1.3 Summary of Total Projected MLLW Volumes by Inventory and Management Activity: FY 2000 - FY 2070

The tables and figure in this section provide summary data on MLLW projections. Table 8-2 summarizes the cumulative projected volume of MLLW by management activity for FY 2000 through FY 2070. Table 8-3 provides these projections in more detail and also includes data on the projected MLLW inventories. Figure 8-1 presents the total projected volumes of MLLW inventories and management activities.

**Table 8-2**
**Summary of Cumulative Projected MLLW Volumes**
**by Management Activity as Reported by Sites:**
**FY 2000 - FY 2070**
(Includes all physical forms except waste water)

In cubic meters

| | |
|---|---|
| New Generation | 102,458 |
| Treatment | 66,060 |
| Receipts | 134,070 |
| Disposal | 179,929 |

**Table 8-3**
**Summary of Total Projected MLLW Volumes by Inventory and Management Activity:**
**FY 2000 - FY 2070**
(Includes all physical forms except waste water)

In cubic meters

| | FY 2000[a] | FY 2001[a] | FY 2002[a] | FY 2003[a] | FY 2004[a] | FY 2005[a] | FY 2006[a] | FY 2007[a] |
|---|---|---|---|---|---|---|---|---|
| Inventory (Storage) | 38,848 | 33,956 | 25,256 | 18,672 | 14,629 | 10,215 | 7,570 | 7,129 |
| New Generation | 5,424 | 1,774 | 1,864 | 2,125 | 2,314 | 2,164 | 1,633 | 1,859 |
| Treatment | 6,615 | 6,752 | 6,584 | 5,153 | 2,407 | 2,952 | 1,621 | 1,401 |
| Receipts | 12,332 | 8,213 | 10,474 | 8,191 | 7,788 | 11,461 | 26,063 | 1,297 |
| Disposal | 11,230 | 7,387 | 10,579 | 8,532 | 8,440 | 12,587 | 27,144 | 2,472 |

| | FY 2008[a] | FY 2009[a] | FY 2010[a] | FY 2011-2015 | FY 2016-2020 | FY 2021-2025 | FY 2026-2030 | FY 2031-2035 |
|---|---|---|---|---|---|---|---|---|
| Inventory (Storage) | 6,772 | 6,130 | 5,991 | 3,412 | 2,225 | 1,944 | 1,545 | 810 |
| New Generation | 1,641 | 1,710 | 2,009 | 9,100 | 16,494 | 16,258 | 11,667 | 4,268 |
| Treatment | 1,723 | 1,284 | 1,693 | 6,483 | 6,641 | 4,736 | 4,286 | 2,506 |
| Receipts | 1,078 | 1,390 | 1,024 | 4,917 | 4,833 | 4,550 | 4,306 | 4,048 |
| Disposal | 2,150 | 2,531 | 2,867 | 12,417 | 17,560 | 16,204 | 11,666 | 4,338 |

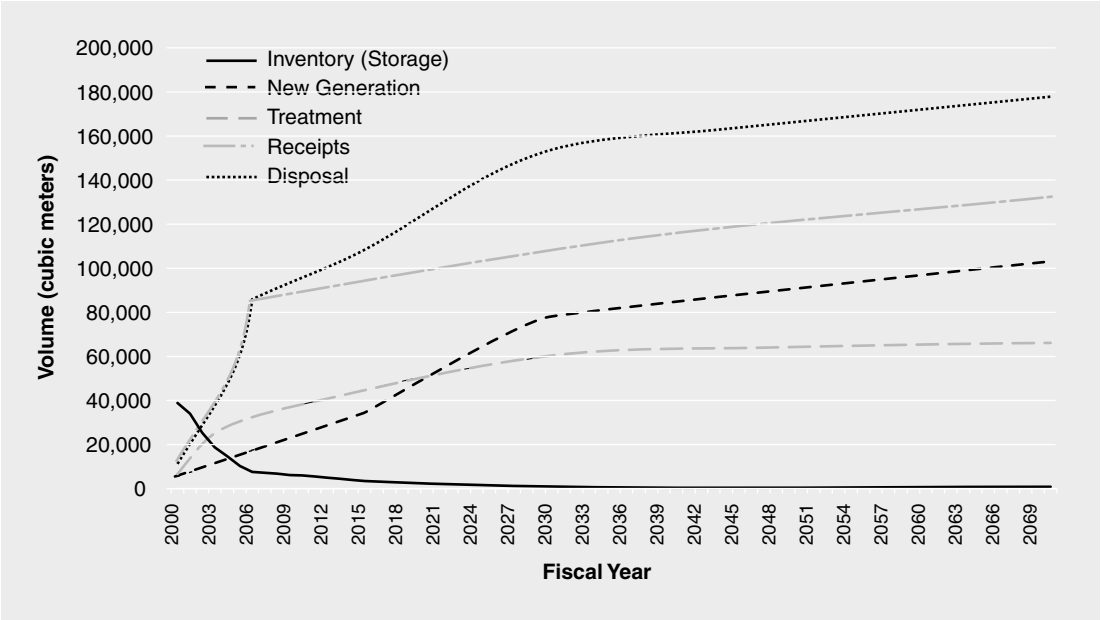
| | FY 2036-2040 | FY 2041-2045 | FY 2046-2050 | FY 2051-2055 | FY 2056-2060 | FY 2061-2065 | FY 2066-2070 | Non-Annualized[b] |
|---|---|---|---|---|---|---|---|---|
| Inventory (Storage) | 797 | 797 | 794 | 791 | 791 | 791 | 791 | 791 |
| New Generation | 2,930 | 2,917 | 2,870 | 2,859 | 2,859 | 2,859 | 2,859 | - |
| Treatment | 473 | 474 | 457 | 454 | 454 | 454 | 454 | - |
| Receipts | 2,861 | 2,857 | 2,857 | 2,853 | 2,850 | 2,850 | 2,851 | 2,125 |
| Disposal | 2,868 | 2,851 | 2,808 | 2,796 | 2,793 | 2,793 | 2,794 | 2,123 |

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sum of the site-specific data.

[a] These data reflect the annual volume projected by sites for FY 2000 - FY 2010. All data (other than inventory data) reported for the post-FY 2010 time periods reflect the total volume projected for the specific five-year time periods. The post-FY 2010 inventory data reflect the total volume projected for the end of each five-year time period.

[b] Non-annualized volumes refer to those volumes of MLLW for which the DOE could not specify when the management activity would occur.

**Figure 8-1**
**Summary of Total Projected MLLW Volumes by Inventory and Management Activity: FY 2000 - FY 2070**
(Includes all physical forms except waste water)




Notes:
• Annual volumes are shown through FY 2010. Volumes shown for subsequent years were calculated based on the data reported by sites for each five-year time period through FY 2070. See Table 8-3 for further information.
• Volumes (except inventory) are shown as cumulative over time.

## 8.2 MLLW Inventory as Reported by Sites

Inventory is defined as the material that is in storage at a facility or site at a given time. This section provides data on end-of-year inventories.

### 8.2.1 MLLW Inventory Data by Site and State

The following tables and figures detail the actual volumes of MLLW in inventory as reported by DOE sites. Table 8-4 provides MLLW volumes in inventory at the end of FY 1998 and FY 1999; and Table 8-5 provides state totals for FY 1998 and FY 1999 MLLW inventory volumes. Figure 8-2 shows the geographic distribution of MLLW across the U.S. at the end of FY 1999; and Figures 8-3 and 8-4 show sites' relative contributions to the total volume of MLLW in inventory at the end of FY 1998 and FY 1999.

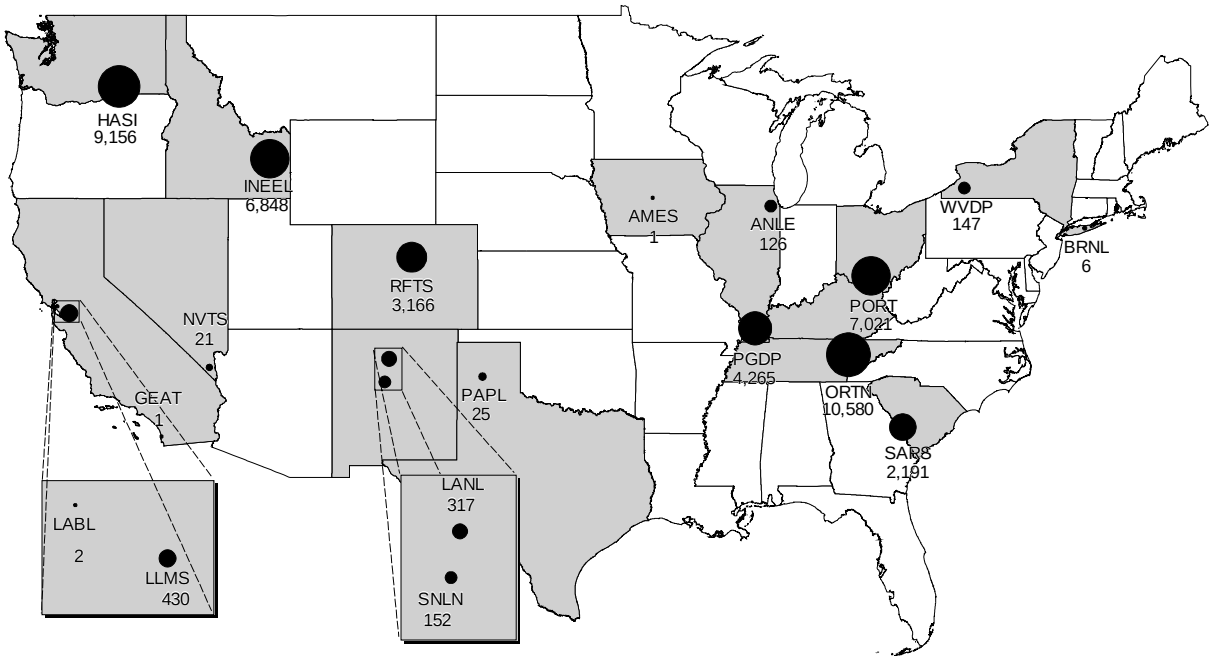
**Table 8-4**
**Total Volume of MLLW in Inventory as Reported by Sites:**
**FY 1998 and FY 1999 Actuals**
(Includes all physical forms except waste water)

In cubic meters

| State | Site | Site Code | FY 1998 | % 1998 Total | FY 1999 | % 1999 Total |
|---|---|---|---|---|---|---|
| CA | General Atomics | GEAT | 1 | <1 | 1 | <1 |
| | Laboratory for Energy-Related Health Research | LEHR | - | - | 0.4 | <1 |
| | Lawrence Berkeley National Laboratory | LABL | 10 | <1 | 2 | <1 |
| | Lawrence Livermore National Laboratory - Main Site | LLMS | 433 | <1 | 430 | 1 |
| CO | Rocky Flats Environmental Technology Site | RFTS | 12,242 | 18.4 | 3,166 | 7.1 |
| IA | Ames Laboratory | AMES | 0.5 | <1 | 0.5 | <1 |
| ID | Argonne National Laboratory - West | ANLW | - | - | 0.1 | <1 |
| | Idaho National Engineering and Environmental Laboratory | INEEL | 4,058 | 6.1 | 6,848 | 15.4 |
| IL | Argonne National Laboratory - East | ANLE | 134 | <1 | 126 | <1 |
| KY | Paducah Gaseous Diffusion Plant | PGDP | 4,176 | 6.3 | 4,265 | 9.6 |
| NM | Los Alamos National Laboratory | LANL | 325 | <1 | 317 | <1 |
| | Sandia National Laboratories - NM | SNLN | 70 | <1 | 152 | <1 |
| NV | Nevada Test Site | NVTS | 13 | <1 | 21 | <1 |
| NY | Brookhaven National Laboratory | BRNL | 13 | <1 | 6 | <1 |
| | West Valley Demonstration Project | WVDP | 149 | <1 | 147 | <1 |
| OH | Miamisburg Environmental Management Project (Mound) | MEMP | 24 | <1 | 0.2 | <1 |
| | Portsmouth Gaseous Diffusion Plant | PORT | 9,059 | 13.6 | 7,021 | 15.8 |
| SC | Savannah River Site | SARS | 2,258 | 3.4 | 2,191 | 4.9 |
| TN | Oak Ridge Reservation | ORTN | 24,271 | 36.5 | 10,580 | 23.8 |
| TX | Pantex Plant | PAPL | 72 | <1 | 25 | <1 |
| WA | Hanford Site | HASI | 9,171 | 13.8 | 9,156 | 20.6 |
| | **Total** | | **66,480** | **100** | **44,455** | **100** |

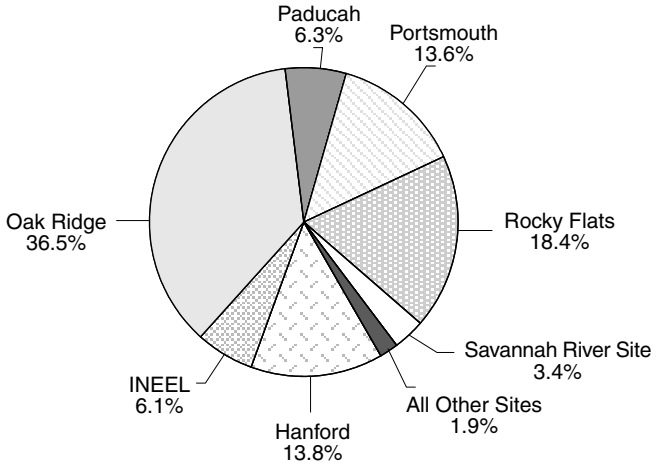
Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sums of the site-specific data.

**Figure 8-2**
**Total Volume of MLLW in Inventory as Reported by Sites: FY 1999 Actuals**



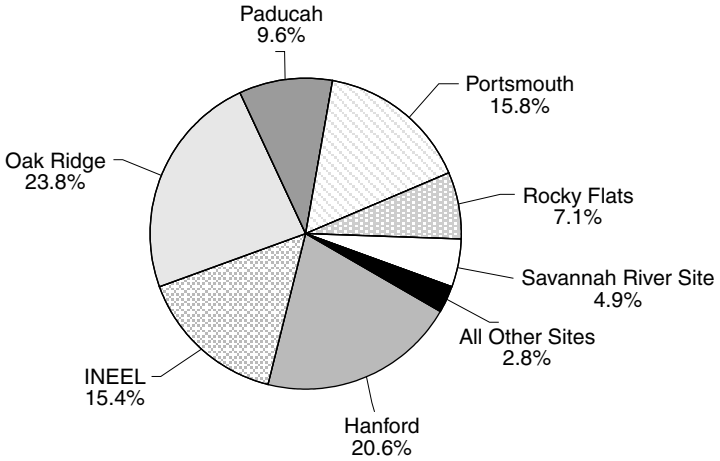

Notes:
• Volumes shown in cubic meters.
• Volumes include all physical forms except waste water.
• While the actual site volumes are labeled numerically on the map, the volume *icons* are based on a logarithmic scale to differentiate more easily between the sites' relative inventories.
• See Table 8-4 for more information.

**Figure 8-3**
**Sites' Relative Contributions to the Volume of MLLW in Inventory as Reported by Sites: FY 1998 Actuals**
(Includes all physical forms except waste water)




Note:
• At the end of FY 1998, the total reported volume (excluding waste water) of MLLW in inventory was approximately 66,480 cubic meters. See Table 8-4 for further details.

**Figure 8-4**
**Sites' Relative Contributions to the Volume of MLLW in Inventory as Reported by Sites: FY 1999 Actuals**
(Includes all physical forms except waste water)




Note:
• At the end of FY 1999, the total reported volume (excluding waste water) of MLLW in inventory was approximately 44,455 cubic meters. See Table 8-4 for further details.

**Table 8-5**
**Total Volume of MLLW in Inventory by State**
**as Reported by Sites: FY 1998 and FY 1999 Actuals**
(Includes all physical forms except waste water)

In cubic meters

| State | FY 1998 | % 1998 Total | FY 1999 | % 1999 Total |
|---|---|---|---|---|
| California | 444 | <1 | 433 | 1.0 |
| Colorado | 12,242 | 18.4 | 3,166 | 7.1 |
| Idaho | 4,058 | 6.1 | 6,848 | 15.4 |
| Illinois | 134 | <1 | 126 | <1 |
| Iowa | 0.5 | <1 | 0.5 | <1 |
| Kentucky | 4,176 | 6.3 | 4,265 | 9.6 |
| Nevada | 13 | <1 | 21 | <1 |
| New Mexico | 395 | <1 | 469 | 1.1 |
| New York | 162 | <1 | 153 | <1 |
| Ohio | 9,083 | 13.7 | 7,021 | 15.8 |
| South Carolina | 2,258 | 3.4 | 2,191 | 4.9 |
| Tennessee | 24,271 | 36.5 | 10,580 | 23.8 |
| Texas | 72 | <1 | 25 | <1 |
| Washington | 9,171 | 13.8 | 9,156 | 20.6 |
| **Total** | **66,480** | **100** | **44,455** | **100** |

Note:
• Due to data rounding, the totals in this table may not equal the exact sums of the site-specific data.

***MLLW Inventory Site Projection Data:***

Site-specific projections (FY 2000 - FY 2070) for MLLW inventory volumes follow in Table 8-6. Figure 8-5 provides projections for MLLW inventory at all sites from FY 2000 through FY 2010. The DOE-wide inventory projection totals for FY 2011 through FY 2070 are shown in Figure 8-6.

**Table 8-6**
**Total Projected Volume of MLLW Inventories as Reported by Sites:**
**FY 2000 - FY 2070**
(Includes all physical forms except waste water)

In cubic meters

| State | Site | Site Code | FY 2000 | FY 2001 | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|---|---|---|---|
| CA | Lawrence Berkeley National Laboratory | LABL | 3 | 2 | 3 | 4 | 0.6 |
| | Lawrence Livermore National Laboratory - Main Site | LLMS | 405 | 384 | 364 | 313 | 203 |
| CO | Rocky Flats Environmental Technology Site | RFTS | 2,901 | 2,459 | 1,562 | 903 | 418 |
| ID | Argonne National Laboratory - West | ANLW | 0.1 | - | - | - | - |
| | Idaho National Engineering and Environmental Laboratory | INEEL | 5,362 | 3,913 | 2,467 | 954 | 826 |
| IL | Argonne National Laboratory - East | ANLE | 44 | 31 | 9 | 2 | 0.1 |
| KY | Paducah Gaseous Diffusion Plant | PGDP | 4,135 | 3,710 | 3,281 | 2,820 | 2,476 |
| NM | Los Alamos National Laboratory | LANL | 256 | 229 | 153 | 34 | - |
| | Sandia National Laboratories - NM | SNLN | 73 | 11 | - | - | - |
| NV | Nevada Test Site | NVTS | 0.3 | - | - | - | - |
| NY | Brookhaven National Laboratory | BRNL | 3 | 0.6 | 0.6 | 0.6 | 0.6 |
| | West Valley Demonstration Project | WVDP | 144 | 4 | 4 | 5 | 0.8 |
| OH | Miamisburg Environmental Management Project (Mound) | MEMP | - | - | - | - | - |
| | Portsmouth Gaseous Diffusion Plant | PORT | 8,575 | 8,184 | 6,339 | 4,045 | 2,219 |
| SC | Savannah River Site | SARS | 2,198 | 2,031 | 1,940 | 1,780 | 1,612 |
| TN | Oak Ridge Reservation | ORTN | 6,872 | 5,433 | 2,106 | 1,008 | 194 |
| TX | Pantex Plant | PAPL | 25 | 25 | 25 | 25 | 25 |
| WA | Hanford Site | HASI | 7,852 | 7,542 | 7,004 | 6,779 | 6,655 |
| | **Total** | | **38,848** | **33,956** | **25,256** | **18,672** | **14,629** |

| State | Site | Site Code | FY 2005 | FY 2006 | FY 2007 | FY 2008 | FY 2009 | FY 2010 |
|---|---|---|---|---|---|---|---|---|
| CA | Lawrence Berkeley National Laboratory | LABL | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| | Lawrence Livermore National Laboratory - Main Site | LLMS | 89 | 37 | 16 | 16 | 16 | 16 |
| CO | Rocky Flats Environmental Technology Site | RFTS | - | - | - | - | - | - |
| ID | Argonne National Laboratory - West | ANLW | - | - | - | - | - | - |
| | Idaho National Engineering and Environmental Laboratory | INEEL | 743 | 664 | 584 | 556 | 556 | 556 |
| IL | Argonne National Laboratory - East | ANLE | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | - |
| KY | Paducah Gaseous Diffusion Plant | PGDP | 1,456 | 549 | 474 | 449 | 29 | 29 |
| NM | Los Alamos National Laboratory | LANL | - | - | - | - | - | - |
| | Sandia National Laboratories - NM | SNLN | - | - | - | - | - | - |
| NV | Nevada Test Site | NVTS | - | - | - | - | - | - |
| NY | Brookhaven National Laboratory | BRNL | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| | West Valley Demonstration Project | WVDP | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| OH | Miamisburg Environmental Management Project (Mound) | MEMP | - | - | - | - | - | - |
| | Portsmouth Gaseous Diffusion Plant | PORT | 769 | - | - | - | - | - |
| SC | Savannah River Site | SARS | 843 | 474 | 357 | 289 | 284 | 509 |
| TN | Oak Ridge Reservation | ORTN | 194 | 194 | 194 | 194 | 194 | 194 |
| TX | Pantex Plant | PAPL | 25 | 25 | 25 | 25 | 25 | 25 |
| WA | Hanford Site | HASI | 6,094 | 5,626 | 5,477 | 5,242 | 5,025 | 4,662 |
| | **Total** | | **10,215** | **7,570** | **7,129** | **6,772** | **6,130** | **5,991** |

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sums of the site-specific data.
• These annual data reflect the projected inventory for FY 2000 - FY 2010.

*(continued…)*

**Table 8-6 (cont'd)**
**Total Projected Volume of MLLW Inventories as Reported by Sites: FY 2000 - FY 2070**
(Includes all physical forms except waste water)

In cubic meters

| State | Site | Site Code | FY 2011-2015 | FY 2016-2020 | FY 2021-2025 | FY 2026-2030 | FY 2031-2035 | FY 2036-2040 |
|---|---|---|---|---|---|---|---|---|
| CA | Lawrence Berkeley National Laboratory | LABL | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| | Lawrence Livermore National Laboratory - Main Site | LLMS | 16 | 16 | 16 | 16 | 16 | 16 |
| CO | Rocky Flats Environmental Technology Site | RFTS | - | - | - | - | - | - |
| ID | Argonne National Laboratory - West | ANLW | - | - | - | - | - | - |
| | Idaho National Engineering and Environmental Laboratory | INEEL | 556 | 556 | 556 | 556 | 556 | 556 |
| IL | Argonne National Laboratory - East | ANLE | - | - | - | - | - | - |
| KY | Paducah Gaseous Diffusion Plant | PGDP | 29 | 29 | - | - | - | - |
| NM | Los Alamos National Laboratory | LANL | - | - | - | - | - | - |
| | Sandia National Laboratories - NM | SNLN | - | - | - | - | - | - |
| NV | Nevada Test Site | NVTS | - | - | - | - | - | - |
| NY | Brookhaven National Laboratory | BRNL | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| | West Valley Demonstration Project | WVDP | - | - | - | - | - | - |
| OH | Miamisburg Environmental Management Project (Mound) | MEMP | - | - | - | - | - | - |
| | Portsmouth Gaseous Diffusion Plant | PORT | - | - | - | - | - | - |
| SC | Savannah River Site | SARS | 604 | 579 | 564 | 530 | 19 | 6 |
| TN | Oak Ridge Reservation | ORTN | 194 | 194 | 194 | 194 | 194 | 194 |
| TX | Pantex Plant | PAPL | 25 | 25 | 25 | 25 | 25 | 25 |
| WA | Hanford Site | HASI | 1,988 | 826 | 590 | 224 | - | - |
| | **Total** | | **3,412** | **2,225** | **1,944** | **1,545** | **810** | **797** |

| State | Site | Site Code | FY 2041-2045 | FY 2046-2050 | FY 2051-2055 | FY 2056-2060 | FY 2061-2065 | FY 2066-2070 | Non-Annualized[a] |
|---|---|---|---|---|---|---|---|---|---|
| CA | Lawrence Berkeley National Laboratory | LABL | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.1 | - |
| | Lawrence Livermore National Laboratory - Main Site | LLMS | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| CO | Rocky Flats Environmental Technology Site | RFTS | - | - | - | - | - | - | - |
| ID | Argonne National Laboratory - West | ANLW | - | - | - | - | - | - | - |
| | Idaho National Engineering and Environmental Laboratory | INEEL | 556 | 556 | 556 | 556 | 556 | 556 | 556 |
| IL | Argonne National Laboratory - East | ANLE | - | - | - | - | - | - | - |
| KY | Paducah Gaseous Diffusion Plant | PGDP | - | - | - | - | - | - | - |
| NM | Los Alamos National Laboratory | LANL | - | - | - | - | - | - | - |
| | Sandia National Laboratories - NM | SNLN | - | - | - | - | - | - | 0.001 |
| NV | Nevada Test Site | NVTS | - | - | - | - | - | - | - |
| NY | Brookhaven National Laboratory | BRNL | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| | West Valley Demonstration Project | WVDP | - | - | - | - | - | - | 0.001 |
| OH | Miamisburg Environmental Management Project (Mound) | MEMP | - | - | - | - | - | - | - |
| | Portsmouth Gaseous Diffusion Plant | PORT | - | - | - | - | - | - | - |
| SC | Savannah River Site | SARS | 6 | 3 | | | | | - |
| TN | Oak Ridge Reservation | ORTN | 194 | 194 | 194 | 194 | 194 | 194 | 194 |
| TX | Pantex Plant | PAPL | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| WA | Hanford Site | HASI | - | - | - | - | - | - | - |
| | **Total** | | **797** | **794** | **791** | **791** | **791** | **791** | **791** |

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sum of the site-specific data.
• Post-FY 2010 data reflect the projected inventory for the last year in each five-year time period.

[a] Non-annualized refers to those volumes of MLLW for which DOE sites could not specify the time period during which the MLLW would be in inventory.

**Figure 8-5**
**Total Projected Volume of MLLW Inventories as Reported by Sites:**
**FY 2000 - FY 2010**
(Includes all physical forms except waste water)

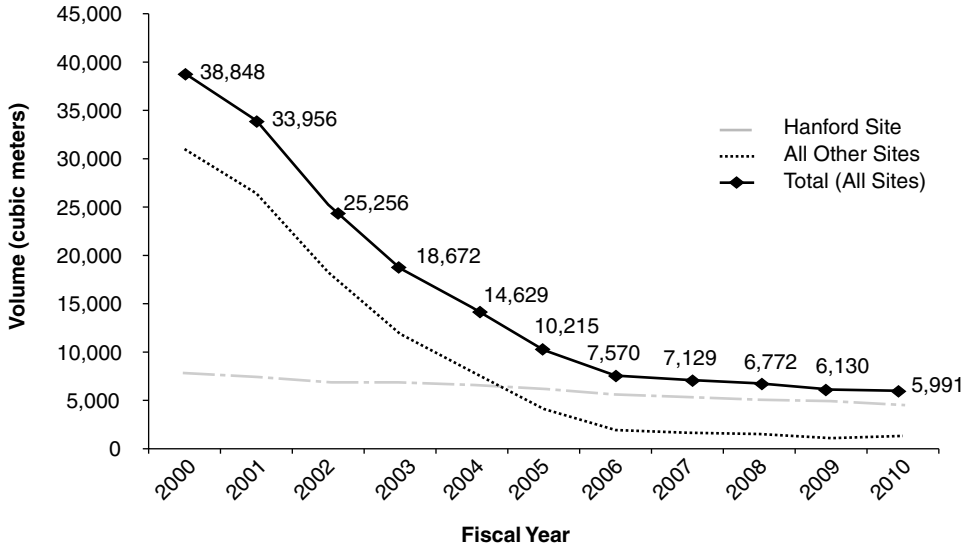
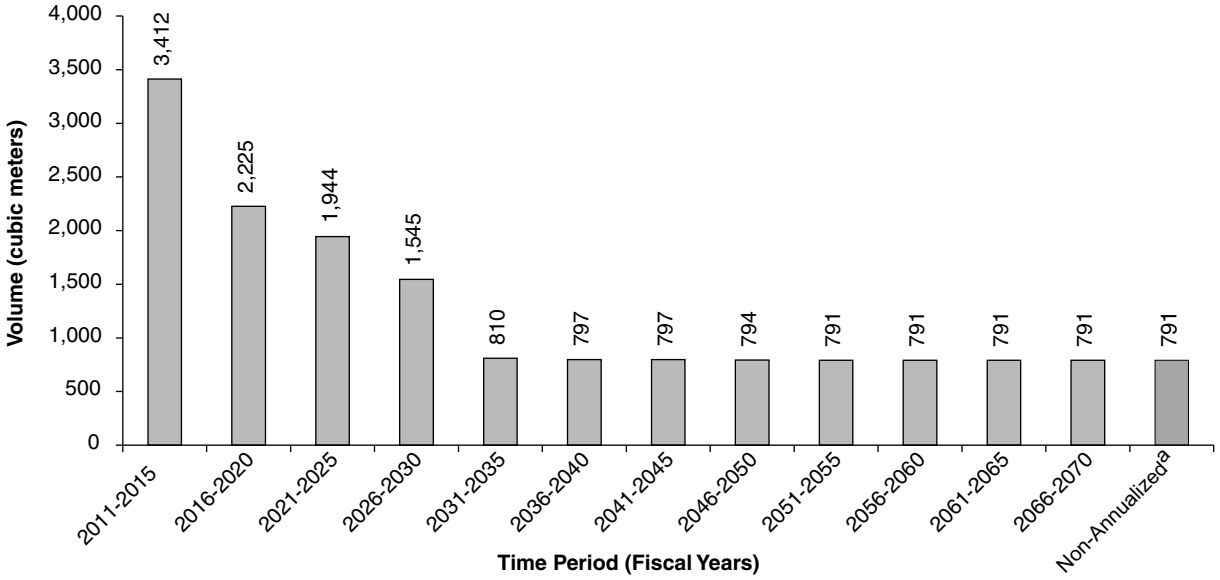



**Figure 8-6**
**Total Projected Volume of MLLW Inventories as Reported by Sites:**
**FY 2011 - FY 2070**
(Includes all physical forms except waste water)




Notes:
• The data in this figure reflect the projected inventory for the last year in each five-year time period.

[a] Non-annualized refers to those volumes of MLLW for which DOE sites could not specify the time period during which the MLLW would be in inventory

### 8.2.2 MLLW Inventory Data by Physical Form

Table 8-7 details the physical forms of the MLLW volumes in inventory at the end of FY 1998 and FY 1999 as reported by DOE sites.

**Table 8-7**
**Total Volume of MLLW in Inventory by Physical Form as Reported by Sites: FY 1998 and FY 1999 Actuals.**
(Includes all physical forms except waste water)

In cubic meters

| Physical Form | Form Code | FY 1998 | % 1998 Total | FY 1999 | % 1999 Total |
|---|---|---|---|---|---|
| Aqueous Liquids/Slurries | L1000 | 131 | <1 | 15 | <1 |
| Batteries | X7400 | 0.04 | <1 | 0.04 | <1 |
| Cement Forms | Z1110 | 296 | <1 | 368 | <1 |
| Compressed Gases/Aerosols | X7700 | 7 | <1 | 7 | <1 |
| Debris Waste | S5000 | 3,430 | 5.2 | 6,030 | 13.6 |
| Decontaminated Solids | Z2000 | - | - | 14 | <1 |
| Elemental Hazardous Metals | X7200 | 134 | <1 | 87 | <1 |
| Elemental Mercury | X7100 | 21 | <1 | 23 | <1 |
| Explosives/Propellants | X7600 | 0.04 | <1 | 0.1 | <1 |
| Final Waste Forms | Z0000 | - | - | 1 | <1 |
| Heterogeneous Debris | S5400 | 9,017 | 13.6 | 7,321 | 16.5 |
| Homogeneous Solids | S3000 | 5,241 | 7.9 | 185 | <1 |
| Immobilized Forms | Z1000 | 21 | <1 | 25 | <1 |
| Inorganic Debris | S5100 | 900 | 1.4 | 1,024 | 2.3 |
| Inorganic Homogeneous Solids | S3100 | 20 | <1 | 0.02 | <1 |
| Inorganic Particulates | S3110 | 57 | <1 | 88 | <1 |
| Inorganic Sludges | S3120 | 6,440 | 9.7 | 3,293 | 7.4 |
| Lab Packs | X6000 | 6 | <1 | 4 | <1 |
| Liquids | LOOO | 813 | 1.2 | 740 | 1.7 |
| Macroencapsulated Forms | Z1200 | 2 | <1 | 1 | <1 |
| Organic Debris | S5300 | 214 | <1 | 254 | <1 |
| Organic Homogeneous Solids | S3200 | 378 | <1 | 380 | <1 |
| Organic Liquids | L2000 | 962 | 1.4 | 904 | 2.0 |
| Organic Sludges | S3220 | 26 | <1 | 61 | <1 |
| Paint Waste | S3130 | 0.4 | <1 | 0.3 | <1 |
| Reactive Metals | X7500 | 25 | <1 | 26 | <1 |
| Soil/Gravel | S4000 | 5,573 | 8.4 | 3,644 | 8.2 |
| Solidified Homogeneous Solids | S3150 | 169 | <1 | 169 | <1 |
| Solidified Organic Solids | S3152 | 17 | <1 | 17 | <1 |
| Solids | S0000 | 17,760 | 26.7 | 10,816 | 24.3 |
| Special Waste | X7000 | 160 | <1 | 160 | <1 |
| Specific Waste Forms | X0000 | 335 | <1 | 267 | <1 |
| Unknown/Other Matrix | U9999 | 13,730 | 20.7 | 7,712 | 17.3 |
| Vitrified Forms | Z1120 | 596 | <1 | 819 | 1.8 |
| **Total** | | **66,480** | **100** | **44,455** | **100** |

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sums of the form-specific data.
• Waste water totals are provided separately in Section 8.7.

## 8.3 MLLW-New Generation as Reported by Sites

In this report, the generation data represent all new MLLW generated from ongoing programmatic activities. These data do not include additional volumes that result from treatment processes[7] or volumes transferred between sites.

### 8.3.1 MLLW-New Generation Data by Site and State

Table 8-8 provides MLLW newly-generated volumes for FY 1998 and FY 1999, while Table 8-9 presents these data by state. Figures 8-7 and 8-8 show sites' relative contributions to the total volume of MLLW newly-generated in FY 1998 and FY 1999, respectively.

**Table 8-8**
**Total Volume of MLLW Newly-Generated as Reported by Sites:**
**FY 1998 and FY 1999 Actuals**
(Includes all physical forms except waste water)

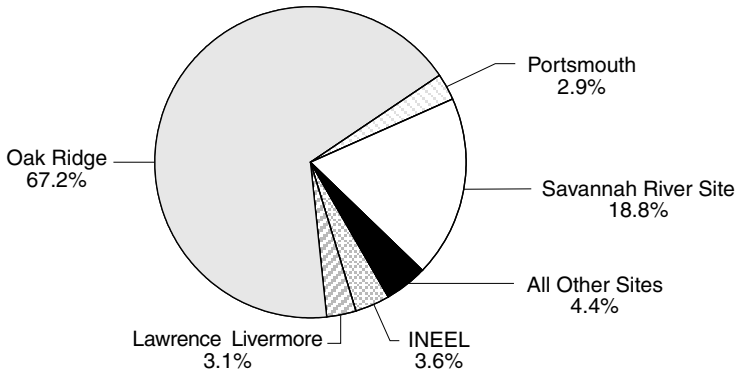
In cubic meters

| State | Site | Site Code | FY 1998 | % 1998 Total | FY 1999 | % 1999 Total |
|---|---|---|---|---|---|---|
| CA | General Atomics | GEAT | 0.1 | <1 | - | - |
| | Lawrence Berkeley National Laboratory | LABL | 6 | <1 | 2 | <1 |
| | Lawrence Livermore National Laboratory - Main Site | LLMS | 92 | 3.1 | 84 | 2.8 |
| CO | Rocky Flats Environmental Technology Site | RFTS | - | - | 194 | 6.5 |
| IA | Ames Laboratory | AMES | 0.5 | <1 | 0.01 | <1 |
| ID | Argonne National Laboratory - West | ANLW | - | - | 16 | <1 |
| | Idaho National Engineering and Environmental Laboratory | INEEL | 106 | 3.6 | 105 | 3.5 |
| IL | Argonne National Laboratory - East | ANLE | 19 | <1 | 4 | <1 |
| KY | Paducah Gaseous Diffusion Plant | PGDP | 42 | 1.4 | 90 | 3.0 |
| NJ | Princeton Plasma Physics Laboratory | PPPL | 2 | <1 | - | - |
| NM | Los Alamos National Laboratory | LANL | 16 | <1 | 57 | 1.9 |
| | Sandia National Laboratories - NM | SNLN | 3 | <1 | 37 | 1.2 |
| NV | Nevada Test Site | NVTS | 0.3 | <1 | 33 | 1.1 |
| NY | Brookhaven National Laboratory | BRNL | 6 | <1 | 7 | <1 |
| | West Valley Demonstration Project | WVDP | 4 | <1 | 4 | <1 |
| OH | Portsmouth Gaseous Diffusion Plant | PORT | 85 | 2.9 | 2 | <1 |
| SC | Savannah River Site | SARS | 555 | 18.8 | 201 | 6.8 |
| TN | Oak Ridge Reservation | ORTN | 1,985 | 67.2 | 1,790 | 60.3 |
| TX | Pantex Plant | PAPL | 23 | <1 | 7 | <1 |
| WA | Hanford Site | HASI | 9 | <1 | 335 | 11.3 |
| | **Total** | | **2,954** | **100** | **2,968** | **100** |

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sum of the site-specific data.

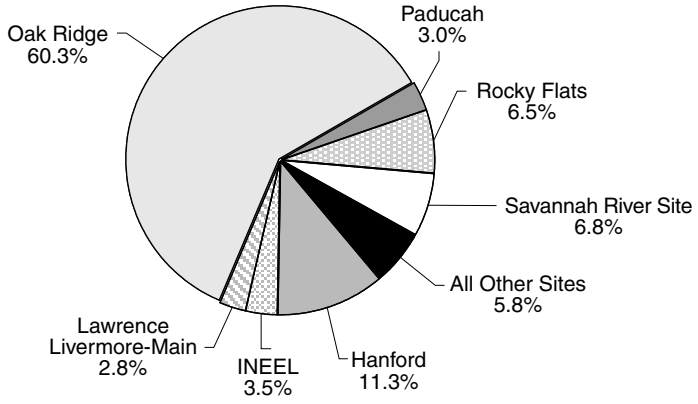
[7] The term in the FY 2000 EM Corporate Database for waste that results from treatment processes is "process outputs."

**Figure 8-7**
**Sites' Relative Contributions to the Volume of MLLW Newly-Generated as Reported by Sites: FY 1998 Actuals**
(Includes all physical forms except waste water)




Note:
• The total reported volume (excluding waste water) of MLLW newly-generated in FY 1998 was approximately 2,954 cubic meters. See Table 8-8 for further details.

**Figure 8-8**
**Sites' Relative Contributions to the Volume of MLLW Newly-Generated as Reported by Sites: FY 1999 Actuals**
(Includes all physical forms except waste water)




Note:
• The total reported volume (excluding waste water) of MLLW newly-generated in FY 1999 was approximately 2,968 cubic meters. See Table 8-8 for further details.

**Table 8-9**
**Total Volume of MLLW Newly-Generated by State as Reported by Sites: FY 1998 and FY 1999 Actuals**
(Includes all physical forms except waste water)

In cubic meters

| State | FY 1998 | % 1998 Total | FY 1999 | % 1999 Total |
|---|---|---|---|---|
| California | 98 | 3.3 | 86 | 2.9 |
| Colorado | - | - | 194 | 6.5 |
| Idaho | 106 | 3.6 | 121 | 4.1 |
| Illinois | 19 | <1 | 4 | <1 |
| Iowa | 0.5 | <1 | 0.01 | <1 |
| Kentucky | 42 | 1.4 | 90 | 3 |
| Nevada | 0.3 | <1 | 33 | 1.1 |
| New Jersey | 2 | <1 | - | - |
| New Mexico | 19 | <1 | 94 | 3.2 |
| New York | 10 | <1 | 11 | <1 |
| Ohio | 85 | 2.9 | 2 | <1 |
| South Carolina | 555 | 18.8 | 201 | 6.8 |
| Tennessee | 1,985 | 67.2 | 1,790 | 60.3 |
| Texas | 23 | <1 | 7 | <1 |
| Washington | 9 | <1 | 335 | 11.3 |
| **Total** | **2,954** | **100** | **2,968** | **100** |

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sum of the site-specific data.

***MLLW-New Generation Site Projection Data:***

This section provides MLLW-new generation projection data for FY 2000 through FY 2070. Table 8-10 shows site-specific projections for the entire time period and indicates the last year each site plans to generate MLLW. Table 8-11 provides these projections in more detail. Figure 8-9 shows projections for MLLW-new generation volumes at all sites from FY 2000 through FY 2010. The DOE-wide new generation projection totals for FY 2011 through FY 2070 are shown in Figure 8-10.

**Table 8-10**
**Summary of Total Projected MLLW-New Generation Volumes**
**as Reported by Sites: FY 2000 - FY 2070**
(Includes all physical forms except waste water)

In cubic meters

| State | Site | Site Code | Total All Years | % Total | Last FY/Time Period Projected |
|---|---|---|---|---|---|
| CA | Laboratory for Energy-Related Health Research | LEHR | 3 | <1 | 2002 |
| | Lawrence Berkeley National Laboratory | LABL | 153 | <1 | 2066-2070 |
| | Lawrence Livermore National Laboratory - Main Site | LLMS | 5,054 | 4.9 | 2066-2070 |
| CO | Rocky Flats Environmental Technology Site | RFTS | 809 | <1 | 2006 |
| IA | Ames Laboratory | AMES | 0.7 | <1 | 2066-2070 |
| ID | Argonne National Laboratory - West | ANLW | 3 | <1 | 2000 |
| | Idaho National Engineering and Environmental Laboratory | INEEL | 5,653 | 5.5 | 2031-2035 |
| IL | Argonne National Laboratory - East | ANLE | 465 | <1 | 2066-2070 |
| KY | Paducah Gaseous Diffusion Plant | PGDP | 1,301 | 1.3 | 2021-2025 |
| NJ | Princeton Plasma Physics Laboratory | PPPL | 142 | <1 | 2066-2070 |
| NM | Los Alamos National Laboratory | LANL | 16 | <1 | 2007 |
| | Lovelace Respiratory Research Institute | LRRI | 71 | <1 | 2066-2070 |
| | Sandia National Laboratories - NM | SNLN | 1,033 | 1.0 | 2066-2070 |
| NY | Brookhaven National Laboratory | BRNL | 369 | <1 | 2066-2070 |
| | West Valley Demonstration Project | WVDP | 8 | <1 | 2004 |
| OH | Portsmouth Gaseous Diffusion Plant | PGDP | 1,801 | 1.8 | 2006 |
| SC | Savannah River Site | SARS | 3,683 | 3.6 | 2041-2045 |
| TN | Oak Ridge Reservation | ORTN | 35,635 | 34.8 | 2066-2070 |
| WA | Hanford Site | HASI | 46,259 | 45.1 | 2046-2050 |
| | **Total** | | **102,458** | **100** | |

Note:
• Due to data rounding, the totals in this table may not equal the exact sum of the site-specific data.

**Table 8-11**
**Total Projected Volume of MLLW-New Generation as Reported by Sites:**
**FY 2000 - FY 2070**
(Includes all physical forms except waste water)

In cubic meters

| State | Site | Site Code | FY 2000[a] | FY 2001-2005 | FY 2006-2010 | FY 2011-2015 | FY 2016-2020 |
|---|---|---|---|---|---|---|---|
| CA | Laboratory for Energy-Related Health Research | LEHR | - | 3 | - | - | - |
| | Lawrence Berkeley National Laboratory | LABL | 2 | 11 | 11 | 11 | 11 |
| | Lawrence Livermore National Laboratory - Main Site | LLMS | 84 | 355 | 355 | 355 | 355 |
| CO | Rocky Flats Environmental Technology Site | RFTS | 164 | 568 | 77 | - | - |
| IA | Ames Laboratory | AMES | 0.01 | 0.05 | 0.05 | 0.05 | 0.05 |
| ID | Argonne National Laboratory-West | ANLW | 3 | - | - | - | - |
| | Idaho National Engineering and Environmental Laboratory | INEEL | 145 | 748 | 793 | 793 | 793 |
| IL | Argonne National Laboratory-East | ANLE | 7 | 34 | 33 | 33 | 33 |
| KY | Paducah Gaseous Diffusion Plant | PGDP | 33 | 642 | 220 | 145 | 145 |
| NJ | Princeton Plasma Physics Laboratory | PPPL | 2 | 10 | 10 | 10 | 10 |
| NM | Los Alamos National Laboratory | LANL | 2 | 10 | 4 | - | - |
| | Lovelace Respiratory Research Institute | LRRI | 1 | 5 | 5 | 5 | 5 |
| | Sandia National Laboratories-NM | SNLN | 22 | 71 | 74 | 72 | 72 |
| NY | Brookhaven National Laboratory | BRNL | 5 | 26 | 26 | 26 | 26 |
| | West Valley Demonstration Project | WVDP | 2 | 6 | - | - | - |
| OH | Portsmouth Gaseous Diffusion Plant | PGDP | 1,681 | 91 | 29 | - | - |
| SC | Savannah River Site | SARS | 91 | 449 | 372 | 646 | 709 |
| TN | Oak Ridge Reservation | ORTN | 2,768 | 2,349 | 2,348 | 2,348 | 2,348 |
| WA | Hanford Site | HASI | 414 | 4,863 | 4,496 | 4,656 | 11,988 |
| | **Total** | | **5,424** | **10,242** | **8,852** | **9,100** | **16,494** |

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sum of the site-specific data.

[a] These annual data reflect the total volume projected by sites for FY 2000. Post-FY 2000 data reflect the total summary volume projected for the specific five-year time period.

*(continued…)*

**Table 8-11 (cont'd)**
**Total Projected Volume of MLLW-New Generation as Reported by Sites:**
**FY 2000 - FY 2070**
(Includes all physical forms except waste water)

In cubic meters

| State | Site | Site Code | FY 2021-2025 | FY 2026-2030 | FY 2031-2035 | FY 2036-2040 | FY 2041-2045 |
|---|---|---|---|---|---|---|---|
| CA | Laboratory for Energy-Related Health Research | LEHR | - | - | - | - | - |
| | Lawrence Berkeley National Laboratory | LABL | 11 | 11 | 11 | 11 | 11 |
| | Lawrence Livermore National Laboratory - Main Site | LLMS | 355 | 355 | 355 | 355 | 355 |
| CO | Rocky Flats Environmental Technology Site | RFTS | - | - | - | - | - |
| IA | Ames Laboratory | AMES | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| ID | Argonne National Laboratory-West | ANLW | - | - | - | - | - |
| | Idaho National Engineering and Environmental Laboratory | INEEL | 793 | 793 | 793 | - | - |
| IL | Argonne National Laboratory-East | ANLE | 33 | 33 | 33 | 33 | 33 |
| KY | Paducah Gaseous Diffusion Plant | PGDP | 116 | | | - | - |
| NJ | Princeton Plasma Physics Laboratory | PPPL | 10 | 10 | 10 | 10 | 10 |
| NM | Los Alamos National Laboratory | LANL | - | - | - | - | - |
| NM | Lovelace Respiratory Research Institute | LRRI | 5 | 5 | 5 | 5 | 5 |
| NM | Sandia National Laboratories-NM | SNLN | 72 | 72 | 72 | 72 | 72 |
| NY | Brookhaven National Laboratory | BRNL | 26 | 26 | 26 | 26 | 26 |
| | West Valley Demonstration Project | WVDP | - | - | - | - | - |
| OH | Portsmouth Gaseous Diffusion Plant | PGDP | - | - | - | - | - |
| SC | Savannah River Site | SARS | 708 | 701 | 3 | 4 | 3 |
| TN | Oak Ridge Reservation | ORTN | 2,348 | 2,348 | 2,348 | 2,348 | 2,348 |
| WA | Hanford Site | HASI | 11,781 | 7,314 | 614 | 67 | 55 |
| | **Total** | | **16,258** | **11,667** | **4,268** | **2,930** | **2,917** |

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sum of the site-specific data.
• All post-FY 2000 data reflect the total summary volume projected for the specific five-year time period.

*(continued…)*

**Table 8-11 (cont'd)**
**Total Projected Volume of MLLW-New Generation as Reported by Sites:**
**FY 2000 - FY 2070**
(Includes all physical forms except waste water)

In cubic meters

| State | Site | Site Code | FY 2046-2050 | FY 2051-2055 | FY 2056-2060 | FY 2061-2065 | FY 2066-2070 | Site Total |
|---|---|---|---|---|---|---|---|---|
| CA | Laboratory for Energy-Related Health Research | LEHR | - | - | - | - | - | **3** |
| | Lawrence Berkeley National Laboratory | LABL | 11 | 11 | 11 | 11 | 11 | **153** |
| | Lawrence Livermore National Laboratory - Main Site | LLMS | 355 | 355 | 355 | 355 | 355 | **5,054** |
| CO | Rocky Flats Environmental Technology Site | RFTS | - | - | - | - | - | **809** |
| IA | Ames Laboratory | AMES | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | **0.7** |
| ID | Argonne National Laboratory-West | ANLW | - | - | - | - | - | **3** |
| | Idaho National Engineering and Environmental Laboratory | INEEL | - | - | - | - | - | **5,653** |
| IL | Argonne National Laboratory-East | ANLE | 33 | 33 | 33 | 33 | 33 | **465** |
| KY | Paducah Gaseous Diffusion Plant | PGDP | - | - | - | - | - | **1,301** |
| NJ | Princeton Plasma Physics Laboratory | PPPL | 10 | 10 | 10 | 10 | 10 | **142** |
| NM | Los Alamos National Laboratory | LANL | - | - | - | - | - | **16** |
| | Lovelace Respiratory Research Institute | LRRI | 5 | 5 | 5 | 5 | 5 | **71** |
| | Sandia National Laboratories-NM | SNLN | 72 | 72 | 72 | 72 | 72 | **1,033** |
| NY | Brookhaven National Laboratory | BRNL | 26 | 26 | 26 | 26 | 26 | **369** |
| | West Valley Demonstration Project | WVDP | - | - | - | - | - | **8** |
| OH | Portsmouth Gaseous Diffusion Plant | PGDP | - | - | - | - | - | **1,801** |
| SC | Savannah River Site | SARS | - | - | - | - | - | **3,683** |
| TN | Oak Ridge Reservation | ORTN | 2,348 | 2,348 | 2,348 | 2,348 | 2,348 | **35,645** |
| WA | Hanford Site | HASI | 11 | - | - | - | - | **46,259** |
| | **Total** | | **2,870** | **2,859** | **2,859** | **2,859** | **2,859** | **102,458** |

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sum of the site-specific data.
• All post-FY 2000 data reflect the total summary volume projected for the specific five-year time period.

**Figure 8-9**
**Total Projected Volume of MLLW-New Generation**
**as Reported by Sites: FY 2000 - FY 2010**
(Includes all physical forms except waste water)

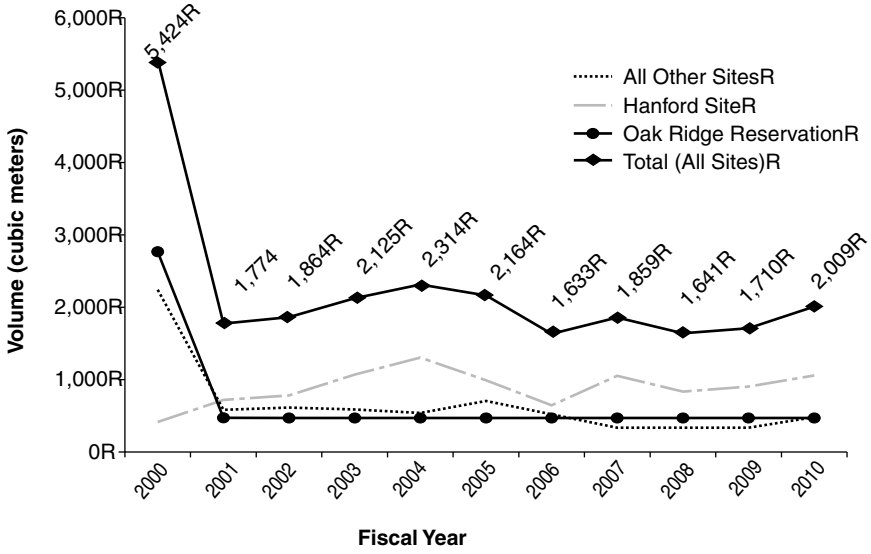
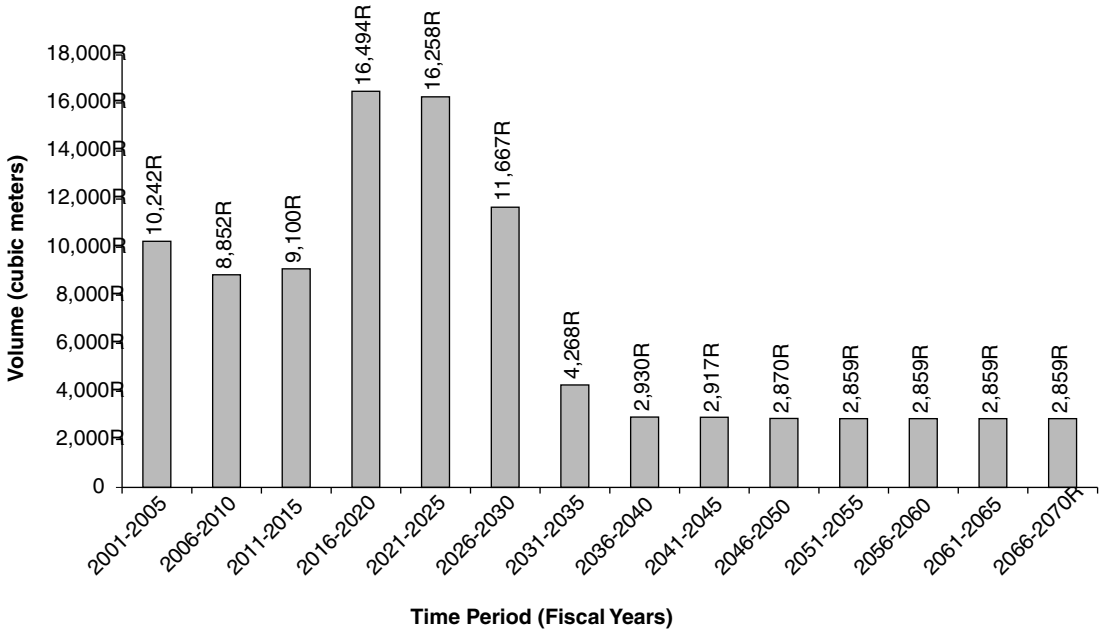



**Figure 8-10**
**Total Projected Volume of MLLW-New Generation**
**as Reported by Sites: FY 2001 - FY 2070**
(Includes all physical forms except waste water)



### 8.3.2 MLLW-New Generation Data by Physical Form

Table 8-12 details the physical forms of the MLLW newly-generated in FY 1998 and FY 1999.

**Table 8-12**
**Total Volume of MLLW Newly-Generated by Physical Form**
**as Reported by Sites: FY 1998 and FY 1999 Actuals**
(Includes all physical forms except waste water)

In cubic meters

| Physical Form | Form Code | FY 1998 | % 1998 Total | FY 1999 | % 1999 Total |
|---|---|---|---|---|---|
| Aqueous Liquids/Slurries | L1000 | 277 | 9.4 | 45 | 1.5 |
| Compressed Gases/Aerosols | X7700 | 0.01 | <1 | - | - |
| Debris Waste | S5000 | 41 | 1.4 | 50 | 1.7 |
| Elemental Hazardous Metals | X7200 | 0.2 | <1 | 18 | <1 |
| Elemental Mercury | X7100 | 0.04 | <1 | 2 | <1 |
| Explosives/Propellants | X7600 | 0.02 | <1 | 0.1 | <1 |
| Heterogeneous Debris | S5400 | 361 | 12.2 | 68 | 2.3 |
| Homogeneous Solids | S3000 | 11 | <1 | 6 | <1 |
| Immobilized Forms | Z1000 | 4 | <1 | 4 | <1 |
| Inorganic Debris | S5100 | 42 | 1.4 | 120 | 4.0 |
| Lab Packs | X6000 | 5 | <1 | 0.1 | <1 |
| Liquids | L0000 | 378 | 12.8 | 222 | 7.5 |
| Macroencapsulated Forms | Z1200 | - | - | 1 | <1 |
| Organic Debris | S5300 | 31 | 1.1 | 78 | 2.6 |
| Organic Homogeneous Solids | S3200 | 13 | <1 | 2 | <1 |
| Organic Liquids | L2000 | 49 | 1.7 | 9 | <1 |
| Organic Particulates | S3210 | - | - | 0.2 | <1 |
| Organic Sludges | S3220 | 1 | <1 | 8 | <1 |
| Reactive Metals | X7500 | 1 | <1 | 1 | <1 |
| Sealed Sources | X7800 | - | - | 0.3 | <1 |
| Soil/Gravel | S4000 | - | - | 25 | <1 |
| Solidified Homogeneous Solids | S3150 | - | - | 12 | <1 |
| Solids | S0000 | 22 | <1 | 687 | 23.1 |
| Special Waste | X7000 | 6 | <1 | - | - |
| Specific Waste Forms | X0000 | 50 | 1.7 | 21 | <1 |
| Unknown/Other Matrix | U9999 | 1,662 | 56.3 | 1,588 | 53.5 |
| **Total** | | **2,954** | **100** | **2,968** | **100** |

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sum of the site-specific data.
• Waste water totals are provided separately in Section 8.7.